Gold Rush

SUDDENLY, A DIGITAL GOLD RUSH IS SWEEPING AMERICA.

The sprawling Internet, growing by one million users per month, remains raw and disorganized. And while nobody could argue that it's ready for prime time, the network's hour has surely arrived for corporations seeking low-cost connections to customers, prospects, and far-flung employees. What sprang to life nearly two decades ago as a research-only network has been freed from the red tape that hindered its commercial use. Technology companies have been the first to master its quirks in the hopes of generating profits and finding a competitive edge. Now, it's hard to find a company that isn't willing to give the Internet a chance.

What are the new uses for the Internet? Some companies are relying on it to connect remote offices as a kind of virtual local-area network (LAN). Others are creating their own Internets, inexpensive wide-area networks (WANs) that increasingly have all the security and tools of proprietary networks at a fraction of the cost. Others are discovering what has become, in effect, a new market: They're outsourcing revenue-creating products such as databases or catalogs on the Internet. So a publisher, for example, may hire a service provider to post its catalog of books online, thus making it available to 15 million users.

Then there are those who use the Internet as a step beyond the telephone or fax machine for customer support; for example, to transmit code fixes to customers who need immediate help. There are advertising agencies that send not only ad page mock-ups over the Internet but also compressed video images and sound bites to clients across town, speeding up the collaborative process (not to mention putting armies of bike messengers out of work).

The possibilities are virtually endless, the price–at least for the moment–is right, so companies are discovering the rewards to be reaped by hooking up to the Internet. Of course, not everybody is ready to cash in

But even Internet evangelists admit that everyone doesn't yet realize how to tap the Internet's potential. Part of the problem is that corporate decision makers often have never actually seen what's available, much less used file transfer protocol (FTP) to log onto a remote computer. Complains Eric Dentler, manager of sales systems at Nihon Sun, the Japanese subsidiary of Sun Microsystems Inc.: "Until you can tell the CFO [chief financial officer] how they can make money [on the Internet], they don't move forward." And for some companies thinking of selling goods or services online, there are such tricky matters as figuring out how much to charge and how to collect from people who buy over the Internet.

Not Something You Just Tap Into

The Internet is the ultimate laissez-faire marketplace. Think of it as a town square that is one part farmers market, one part town hall, and one part post office. But unlike other networks that support commerce, it lacks a police department. Traffic, for the most part, flows chaotically. This free-flowing anarchy is what has led to the network's phenomenal growth, but it is also what is so confusing to novice users.

And unlike online services that provide corporations with crucial competitive research, such as Dow Jones & Co. Inc. and Mead Data Central Co.'s Dialog, the Internet's value isn't stored in databases. "What is there out there on the Internet for businesses in terms of real content?" asks Bill Washburn, executive director of the Commercial Internet Exchange (CIX), a trade group that has made it easier for companies to conduct business on the Internet. "I think that's a question a lot of people aren't owning up to."

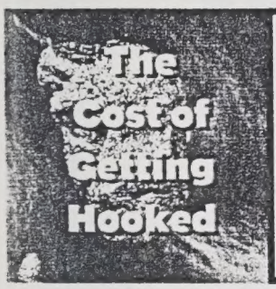
Gigabytes have been spewed pontificating about the Internet's possibilities. But how many businesses really need National Weather Service satellite photos or access to the KGB's once-secret files? The content, or software of the Internet, still lacks a business focus. "Netnews (the Internet's homegrown bulletin boards on a plethora of topics) is great for some people," says Washburn. "But for others it's a bunch of flame wars. Who are we kidding here?"

Nor are the Internet's current attractions easily accessible. "The Internet is not something you just tap into," explains Tod Dagres, a vice president of the Yankee Group, adding that companies hoping to use it commercially should expect to provide

By Jonathan Littman

some training and education. Even Internet applications that should be relatively intuitive–such as sending electronic mail and files–require training and, yes, management.

The current commercial free-for-all began in 1991 when the federal government recognized the inevitable and made it known that it no longer intended to limit the network's backbone for use in research. That policy change created the incentive for the major Internet providers–Performance Systems International Inc. (PSI), Uunet Technologies Inc., and General Atomics' Cerfnet–to create their own commercial backbones that skirt the National Science Foundation's NSFNet. These providers, along with nine other providers such as Sprintlink and Nearnet, formed CIX. Today, virtually every form of commercial traffic is acceptable through CIX providers except, of course, universally frowned-on unsolicited junk mailings.



Dial-up service for a few dozen employees can cost as little as $100 a month. Sprintlink charges $16,750 a year for a 56-kilobyte connection and the lease on a router (plus minimal local phone costs), often ample for modest use by several hundred employees. T1 connections (1.544 megabytes) offer nearly 30 times the volume of traffic–generally enough for a few thousand users–for about double the annual cost: $30,000 to $35,000.

The potential for commercial exploitation was always there. First, the Internet's a TCP/IP protocol network, making it no stranger to most large corporations. Because many already have TCP/IP networks in place, it's relatively simple to connect offices in distant locations over the Internet. Second, low connection costs provide an alternative to building and maintaining expensive proprietary WANs (which also require leasing expensive long-distance lines) or joining limited commercial networks like Compuserve and America Online. Because companies only pay for access to the Internet and local phone charges, costs per user are often extremely low.

Third, the Internet is not only far larger than online commercial services, such as Compuserve, it also provides a wealth of other resources while still enabling users to send and receive e-mail to those smaller networks. By the time you read this article, roughly one million "host" machines in more than 137 countries will be connected to the Internet. Assuming about 10 users per host and a *monthly* growth rate of seven percent, the total number of users should approach 20 million by the end of 1994. According to the Internet Society, 30 percent of the Fortune 500 is on the Internet, and two-thirds of Internet users work for major corporations.

Business Digs It

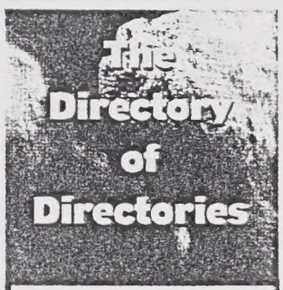
Plain old business communication with customers remains one of the most basic uses of the Internet. Three years ago Alain Pinel Co., then a fledgling real estate firm in Los Gatos, Calif., tried to get an edge on the depressed Silicon Valley real estate market. But the company found it difficult to stay in touch with the overworked engineers, marketing types, and sales people who make up their clientele.

Enter the Internet. For a $180 dedicated (continuous access) monthly dial-up fee to Portal Communications Co. of Cupertino, Calif., plus local telephone charges, Alain Pinel provided its agents with Internet mail. Agents accustomed to sending mail internally over the Los Gatos office's Next local-area TCP/IP network could now send e-mail to customers and partners.

"It provides the ability to access our clients 24 hours a day," says Helen Pastorino, president of the real estate firm. Agents send listings, market analysis, and contingency documents over the net to clients in Silicon Valley, the East Coast, Australia, and England.

Not satisfied with merely communicating with its customers, Alain Pinel created a cheap but effective wide-area Internet with its partners. Agents send escrow information back and forth to local title companies over the Internet. Eager for Alain Pinel's business, seven title companies have made their own inexpensive dial-up arrangements to be on the Internet at a fraction of what electronic data interchange (EDI) costs. The title companies pay $50 a month for Internet dial-up access (messages are sent each hour), plus local phone charges.

"We're just in our infancy, we're just starting to get intracompany usage," says Mark Richards, a partner in Alain Pinel, who has watched the start-up blossom in three years to four offices with 200 agents, 30 support-staff personnel, 800 listings, and annual home sales of $600 million. "I can see our Internet use growing. We haven't really connected the mortgage companies, all the inspectors, the termite companies, the geological people, the roof report."



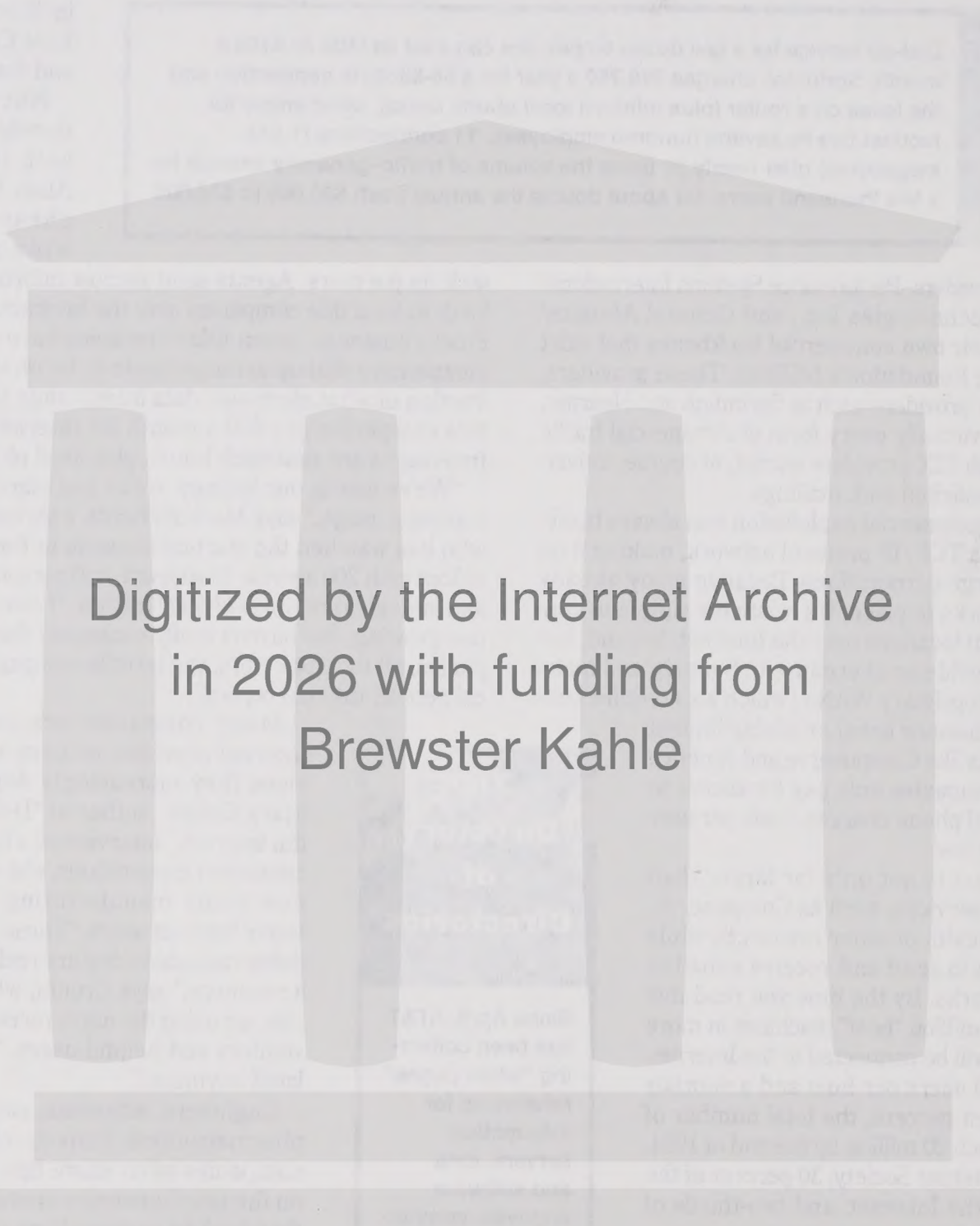
Since April, AT&T has been collecting "white pages" references for information servers, data and software archives, computing centers, and network providers. Access to the white and yellow Directory of Directories is free to Internet users. Only those listing their databases or services in the yellow pages must pay a fee.

Many companies are finding that the Internet provides medium- to high-tech services they increasingly depend on. When Mary Cronin, author of "Doing Business on the Internet," interviewed a hundred Internet-connected corporations, she was surprised by how many manufacturing companies are heavy Internet users. "These small companies doing manufacturing are really finding it to be a resource," says Cronin, who found companies are using the net to receive bug fixes from vendors and helpful users. "They're not isolated anymore."

Engineers, scientists, and researchers in pharmaceutical, biotech, chemical, and oil companies often share tips and information on the net. Sometimes connections are made that lead to partnerships or joint ventures between professionals or companies.

Qualcomm Inc., a San Diego telecommunications company, receives résumés over the Internet to meet its expanding hiring needs. The résumés flow into a Resumex application on a Sun SPARCstation IPX, automatically matching the inquiries to the appropriate job openings and hiring managers. Last summer the firm began running ads in trade magazines in which the headline was its Internet address: `Job@qualcomm.com`.

For some novice users, finding information on the Internet is the equivalent of



Digitized by the Internet Archive
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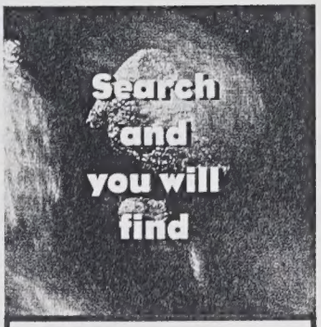
https://archive.org/details/goldrush00jona_0

searching for a needle in a haystack. New navigation and resource tools such as archie, gopher, WAIS, and Worldwide Web are making it easier for companies to publish, index, search, and retrieve business resources on the net. The National Science Foundation recently hired AT&T Business Communications to create a "white" and commercial "yellow" pages for the Internet, as part of its InterNIC program, a five-year project designed to provide public information about the Internet. Needless to say, this type of service is fundamental for business networking.



Search and menu programs like archie and gopher help users find, browse, and transfer data widely dispersed on the net. Popular for "publishing" databases on the net, WAIS, the wide-area information server, enables users to build scripts of interest that can be run daily to create a sort of individual electronic newspaper. Worldwide Web provides the ability to link related words, pictures, and ideas around the Internet in a hypertext environment. Finally, recently introduced commercial versions of these public-domain tools answer corporate concerns of consistency, training, documentation, and support.

Global Opportunities

Consultants and start-ups are trying to peddle the Internet, with its generally upwardly mobile user base, as an inexpensive yet effective marketing tool. A single example: some are partnering with companies to offer such new services as the ordering of magazines, books, or technical articles.

Last summer the publishers of the *New Republic* and a new marketing firm called the Internet Co. joined forces to create The Electronic Newsstand. This "electronic" magazine rack enables Internet users to browse the table of contents or search selected articles from magazines such as the *New Yorker,* the *Economist,* and the *New Republic.*

At the August 1993 Interop conference, O'Reilly & Associates, a Sebastopol, Calif. publishing company, introduced the Global Network Navigator (GNN), an Internet resource center in which users can "browse product brochures, press releases, and white papers; download demonstration software; or interact with a company representative," according to officials. Companies can submit hypertext advertisements that run in this GNN marketplace or in a general GNN guide to the Internet.

Less publicized are the scores of technical publishers that are making everything from technical articles to manuals and documentation available on the net–for a price. Those still squeamish about accepting credit card numbers over the net simply list toll-free 800 telephone numbers.

Others, for a surprisingly low fee, will place your company's inventory or catalog of merchandise, whatever it might be, on the Internet. "In some sense our service is like outsourcing your database," says Subu Subramanian, district manager of AT&T's business-communications services. "The [client] company doesn't have the ongoing responsibility. It doesn't have to incur the overhead of setting up a network connection." AT&T charges $160 per month for posting databases in the 25- to 50-megabyte range, not counting security and access controls.

One competitor, Enterprise Integration Technology (EIT) of Palo Alto, Calif., will put a company's 30-page quarterly catalog on the Internet–potentially reaching millions of customers–for about $15,000 a year. EIT customizes these catalogs to maximize the multimedia possibilities of the Internet, using techniques such as hypertext, which is not currently available on other commercial networks. EIT, like AT&T and other information providers, offers a complete off-site, turnkey service, including its own servers, software, and T1 Internet connection.

It doesn't take a rocket scientist to see where this trend is headed: commercial overload. The multimedia capabilities, attractive demographics, and cheap access of the Internet will inevitably turn it into an advertising vehicle. "If Lexus, the car company, can represent their products [on the Internet], and create a place where customers can read their technical notices," predicts Rob Raisch, president of the Internet Co., "we suddenly provide an environment where consumers can make appropriate decisions." Of course, the notion makes old-time net hackers a trifle nauseous.

The Price Is Right

But even the Internet's heaviest users have yet to tap its full potential. At Unocal in Los Angeles, Internet usage is flourishing despite the fact that the company isn't particularly pushing it. "We haven't done anything," says Peter Ho, network systems engineer. That hasn't stopped intrepid Unocal engineers from traversing the Internet to access seismic data, satellite maps, and land surveys to search for oil and geothermal energy prospects. They also read select newsgroups on the Internet, and send and receive mail and files with other researchers and universities. Ho says one of the most practical uses is to receive new releases, bug fixes, patches, and online technical support from software and hardware vendors. Ho adds two Unocal users a week to the Internet, and the company spends about $12,500 a year for a 56-kilobyte connection to the Cerfnet regional network and a leased line.

While Unocal has eschewed formal training or the development of Internet-specific tools, giant Lockheed Corp. has created a company-wide set of resources for its Internet travelers. Survival is its motive. Faced with cuts in defense spending, the defense contractor has had to watch costs and find new opportunities. Two years ago, Lockheed, already a veteran Internet e-mail user, decided to "create an electronic infrastructure so that researchers could share information, synergize, cooperate, [and] collaborate on research and projects for customers," says Michael Carroll, manager of advanced computer and software applications at corporate headquarters in Calabasas, Calif.

Several architectures were evaluated. But Carroll says the defense contractor "honed in on Internet-like communication" because they "already had a TCP/IP backbone in place. It was fairly straightforward to expand." Public-domain versions of client-server products such as WAIS, an Internet full-text information-indexing and retrieval program, made it inexpensive and easy to build Lockheed's internal Internet databases. "The price was right," says Carroll. "We had the ability to try [the Internet] without significant investment."

Carroll pooled together a few thousand hours of volunteer work and created the Technology Broker System (TBS), a hypermedia search and retrieval environment that bridges the Internet. Employees at both Lockheed Missiles in Space in

Sunnyvale, Calif., and Lockheed Advanced Development in Palmdale, Calif., can search the Commerce Business Daily (via a daily Internet feed) and scan the diverse Lockheed library catalog and a variety of technical and business documents, ranging from manufacturing procedures to management policies to parts catalogs.

Recently, a Lockheed posting to an Internet newsgroup seeking collaborators in database mining elicited an intriguing response from the German research institute for artificial intelligence, DFKI. The upshot: This fall, Lockheed's director of artificial intelligence traveled to Germany to explore joint efforts. "Through the newsgroups and bulletin boards you can make contact [with] people external to your company and explore a strategic, long-term collaboration," says Carroll.

Today, about 5,000 of Lockheed's roughly 70,000 employees are on the Internet; Carroll expects that number to grow by nearly 50 percent in 1994. Lockheed's Internet costs for a T1 line from Advanced Networks and Services, including a router and high-speed modems, runs about $40,000 annually. When you add leased-line phone charges, Lockheed's Internet costs a total of about $10 per user.

The Lure of WANs

Beyond all the intriguing ways to make money on the net, smart companies are beginning to master the Internet's cost-effective networking possibilities, particularly for WAN. "One customer is using our Internet [Sprintlink] to exchange interest rates and submit loan applications to the home bank," says Bob Doyle, director of marketing for Sprintlink. "Commercial companies are using the Internet to communicate with customers or their suppliers and vendors."

Experts admit that proprietary networks are not only expensive to build but are difficult to maintain. "It all comes down to economics," says John Duhring, president of WAIS Inc., a Menlo Park, Calif., vendor of the search and indexing Internet software. Duhring worked on a proposal to build a proprietary network for KPMG Peat Marwick's 200 offices around the world, but estimates in the tens of millions of dollars shelved the proprietary plan. Says Duhring: "Now they are reopening the proposal because of the Internet."

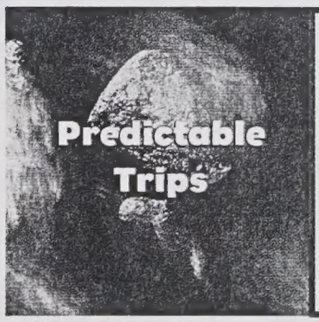
By contrast, the Internet provides many of the capabilities of a private network at a fraction of the cost. Connecting East and West coast offices through a proprietary network could run $60,000 a year just for the T1 line. BARRnet, a regional Internet provider in the San Francisco Bay Area, offers T1 service ranging from about $6,300 to $17,000 per year. Additional charges can include approximately $7,000 in annual phone circuit fees, and less than $10,000 for a router and high-speed modems.

But when it comes to building Internet WANs, the technical foundations vary widely. Frame relay and other emerging technologies used on the Internet improve connections between corporate offices and also provide higher levels of security. And yet, few people have forgotten Robert Morris' worm, which wreaked havoc throughout the hacker-friendly Internet a few years ago. "The primary concern is security," says Tom Nakamura, a senior scientist with Hughes Aircraft, a defense contractor known for working on classified projects. Hughes has both a T1 and a 56-kilobyte link to the Internet and, like many companies, won't talk about what it does for Internet security.

Through creating elaborate firewalls–software, hardware, and sometimes physical breaks between their Internet gateways and their LANs–even companies that deal in the most sensitive of secrets are reducing or eliminating the risk of Internet intruders. Few companies permit remote access to their machines. Traffic, except for routine mail, can generally only go out. Several service providers also sell encryption solutions that scramble the data between corporate sites. Privacy Enhanced Mail–ubiquitous end-to-end encryption–may also provide a partial solution.

Others believe a more complete solution may lie in standard, industry-wide efforts to bring whole subsections of the Internet under a business-tough umbrella. The Microelectronics and Computer Technology Corp., an Austin, Texas, consortium founded by Digital Equipment Corp., NCR Corp., Motorola Inc., and numerous other prominent high-tech firms, recently introduced the Enterprise Integration Network (EINet), a layer of business and security services that reside above a company's existing Internet WAN. One way to think of this infrastructure of network services is as a network software version of the Commercial Internet Exchange.

EINet's existing and proposed standard services for authentication, access control, directory searching (WAIS and X.500), remittance (EDI), and advanced e-mail (text, video, and sound) will infuse an Internet WAN with many of the capabilities of a closed proprietary network. Unlike expensive, proprietary EDI networks, an EINet-enhanced Internet WAN is intended to be relatively inexpensive, yet full-featured, for suppliers and partners, rather than strictly limited to ordering, inventory, and billing. Meanwhile, customers could order products, check deliveries, and the like through ordinary Internet connections.



Using frame-relay switching for the delivery of Internet packets guarantees high performance levels and may improve security. Frame-relay switching creates a fixed path between company sites, while competing protocols often send data in unpredictable trips that can degrade performance and increase the risk that your data will pass through an insecure host.

Frame relay also enables companies to guarantee the performance between two offices by assigning a portion of their bandwidth to that connection, say 16 kilobytes of a 56-kilobyte line. Even if some other company employee overloads the line by downloading a large file, it can't intrude on the performance between the two offices.

That's a glimpse of the future. For the time being, most companies are keeping their commercial Internet usage humble. "We're still building the infrastructure, we're still extending the client software to desktops," says Carroll of Lockheed. But is Lockheed getting enough bang for its buck? "I think we are," says Carroll, carefully measuring his words. "The payoff is potentially very great." ■

Jonathan Littman, a Mill Valley, Calif., freelance writer, has written for Forbes, *the* Los Angeles Times *magazine, and the* San Francisco Chronicle.